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SECURITY INFORMATION
CENTRAL INTELLIGENCE AGENCY

REPORT NO. [REDACTED]

INFORMATION REPORT

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COUNTRY USSR(Ukrainian SSR)

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SUBJECT Ironworks Combine at Voroshilovsk

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INFO. [REDACTED]SUPPLEMENT TO 25X1X
REPORT NO.

1. The Combine of the "Metallurgicheskii Zavod Imeni Voroshilova" (Voroshilov Metallurgical Plant) and "Kokzokhimicheskii Zavod" (Coke and Chemical Factory) was located in the northwestern outskirts of Voroshilovsk, formerly Alchevsk (48°30'N/38°47'E). The Combine bordered the area of the Voroshilovsk railroad station and extended in a southwesterly direction to the area southeast of the Voroshilovgrad (48°34'N/39°20'E)-Debaltsevo (48°21'N/38°26'E) main railroad line. The Combine covered an area of about 2,700 x 400 meters. The plant area was almost entirely in a depression which was about 30 meters below the level of the main railroad line and the coke and chemical factory was in the lowest part of this depression. Spur tracks, with numerous branches in the plant area, led to the double-track main railroad line. The plant had 10 to 12 old shunting locomotives, prime movers with dump cars for material shipments, and about 30 trucks. (1)
2. The blast furnace plant allegedly was built in 1905 and 1906. Part of it was destroyed during the war. There were five blast furnaces early in 1949, four of which were in operation. Blast furnace No 1 was demolished by the Soviets during the war. Its reconstruction started in 1944 and the furnace resumed operation in October or November 1947. It was of American design and early in 1949 produced 1,000 to 1,200 tons daily. Blast furnace No 2 was of American or German design. It had resumed operation in December 1948 and its daily output was 1,000 to 1,200 tons. Blast furnace No 3 had been demolished in World War I and had not yet been rebuilt. Blast furnace No 4 was not damaged in the war. It was of French design and produced 500 tons daily. Blast furnace No 5 was of Russian design and its daily output was 300 tons of pig iron. Early in 1949 blast furnaces No 1 and 2 were tapped every two to three hours. Blast furnaces No 4 and 5 were tapped every four to six hours. The installations of the blast furnace plant included hot blast stoves, a degassing plant, a molding shop, a pig foundry, a steam forge, and two other forges. (2)
3. The open-hearth plant and the rolling mill of the Combine were almost completely destroyed during the war. The rolls which were still usable were removed to Rostov (47°15'N/39°53'E). The area was leveled in late 1948 and allegedly it was planned to construct new blast furnaces and an extension to the loading station in this area. One source learned from Soviet engineers that the rolling mill would be rebuilt 3 to 4 km east of the Voroshilovsk railroad station. 25X1A

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4. The coke and chemical factory was built by German engineers between 1928 and 1934. Part of it was destroyed during the war. The factory covered an area of about 1,200x350 meters and consisted of a coal dressing department with a coal crushing and washing installation, three completed batteries of coke ovens, a gas purifying installation and installations for the production of gas byproducts. Coke oven battery No 2 remained intact during the war while battery No 3 was partially destroyed and batteries No 1 and 4 were completely destroyed. Batteries No 2 and 3 resumed operation in October 1947 and battery No 1 was reconstructed in May 1948, while the site of battery No 4 was still being cleared in January 1949 in preparation for its reconstruction. Also the chemical enterprises of the plant started production on a limited scale in the fall of 1947 and worked at full capacity in October 1948. Reconstruction work was still underway early in 1949. (3)
5. The secondary and auxiliary installations included boiler houses, a pumping station, machine shops with forges, a fitting shop, a pattern making shop, a carpentry shop, technical designing offices, laboratories, and offices, warehouses, bunkers for coal, coke and asphalt, a locomotive repair shop with facilities for the manufacture of spare parts, a repair shop for automobile engines, garages, a carbide installation, lime kilns, a slag block factory, a cement factory, and two sawmills.
6. Power was supplied to the entire Combine through a plant owned transformer station from the large Zaporozhe (47°49'N/35°11'E) power plant. At the transformer station there was also a TETs blast furnace gas - and coal dust-fired power plant. There was another small power plant equipped with two generators in the area of the coke- and chemical factory.
7. The total production was reported to be about 1,900 tons daily during mid-1948. Several sources stated that the daily output early in 1949 was about 3,000 tons of pig iron including 300 to 350 tons of ferro-manganese iron from blast furnace No 5. The bulk of the crude iron was cast in pigs and shipped to the Frunze Metallurgical Plant in Konstantinovka (45°19'N/42°40'E) and allegedly also to Taganrog (47°14'N/38°57'E) and Rostov (47°15'N/39°53'E) for further processing. Railroad wheels and machine parts were produced on a small scale in the plant-owned molding shop and foundry. Coke, coke gas and chemical products were produced in the coke and chemical factory. A daily shipment of 50 carloads of coke for the blast furnace plant and a factory consumption of about 300 tons was reported for the period from January to August 1948.
8. Red iron ore shipments for the blast furnace plant came from Krivoi Rog (47°54'N/33°21'E), manganese ore and limestone from the Urals, allegedly from Magnitogorsk (53°28'N/59°11'E). Large amounts of scrap were stored at the railroad line south of the coke and chemical factory. Part of the scrap came from the plant. The coke and heating gas supply of the ironworks was provided by the coke and chemical factory. However, production was not adequate and additional coke had to be supplied from outside, allegedly from Stalino (48°00'N/37°48'E). The coal for the coke and chemical plant came from the mines in the area of Voroshilovsk, including mines at Sergo-Kadiyevka (48°34'N/38°40'E). The daily incoming shipments were reported to be about 1,500 tons of coal at the end of 1948. (4)
9. Early in 1949 one Gmyria (fnu) was the manager of the Combine. The manager of the blast furnace plant in January 1949, Avanzai (fnu), and

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the manager of the coke and chemical factory, Ivchenko (inu), were subordinate to Gmyria. Also the power plant, the railroad installations the building projects and some secondary enterprises of the Combine were under his control. PWs, German engineers, architects and specialists were still employed in the plant as of the beginning of 1949. The total number of employees, including the construction workers, was about 20,000 early in 1949, about half of whom were women and juveniles. At the same time, 1,200 to 1,500 German PWs and about 500 Soviet convicts worked in the plant. The number of workers employed in the coke and chemical factory was reported to be about 4,000. The work in the Combine was done in three eight-hour shifts.

10. The Ironworks Combine was surrounded by a slag concrete wall, reinforced by a high barbed wire crest. The wall was 2 meters high. There were a number of watchtowers around the plant in which there were sentries on duty 24 hours a day. Guard duty was performed by plant police armed with carbines. The guard was remarkably strict at the transformer station and at the two power plants.

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Comments.

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(1)

- (2) According to previous information the ironworks was founded in 1895. For layout sketch of the blast furnace plant, see Annex 2, based on an old layout plan and on information [redacted] Before the war the plant had more than six blast furnaces with a daily capacity of about 3,200 tons of pig iron. [redacted] the construction of additional blast furnaces, on the site of the former rolling mill and open-hearth plant, was scheduled to start in 1950. One source, however, reported that, according to Soviets, a new open-hearth plant with eight open-hearth furnaces was scheduled to be built on this site. Prior to the war this plant had seven open-hearth furnaces and two Bessemer converters.
- (3) For layout sketch of the coke and chemical factory, see Annex 3 based on information from several of the sources. The factory equipment included a large amount of dismantled German factory equipment. The information [redacted] indicated that this was a modernly equipped factory although the methods of production were not known. In addition to coke, the pre-war production of this factory included ammonia, ammonium sulphate, naphthalene, benzol, coal tar, pitch and phenol. The plant was probably completely reconstructed by the beginning of 1950 and the fourth battery of coke ovens may have been in operation which means that three batteries can be kept constantly in operation with one battery in reserve.
- (4) Based on the reported outgoing shipments of coke, the reported incoming daily supply of coal appears to be far too low. It is not believed likely that the manganese and limestone shipments came from the Urals as adequate limestone deposits exist in Voroshilovsk itself and manganese was probably supplied from nearby Nikopol (47°32'N/34°24'E).

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3 Annexes: 3 - 2 sketches on ditto and
1 photostat

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Voroshilovsk Ironworks Combine

Legend:

1. Four-story brick building, 60 x 25 x 25, completed in rough brickwork but the machinery had not yet been installed. According to Soviets, this shop will allegedly produce paraffin.
2. Concrete building, 35 x 25 x 8 meters, connected by pipelines to the brick building, item 1.
3. Demolished building.
4. Cooling tower under construction. The foundation was two meters deep and 12 meters in diameter.
5. Pattern-making shop, a brick structure, 10 x 6 x 3 meters.
6. Shed for excavation tools, a semi-finished brick structure, 12 x 4 x 6 meters. It also contained a small forge.
7. Installation used for impregnating railroad ties. The installation was 3.5 meters wide, 7 meters long and 1.5 meters deep.
8. Small road bridge over the railroad tracks, 30 meters long and 6 meters wide. This was a stable wooden bridge, suitable for heavy vehicles. It crossed the tracks at a height of 10 meters.
9. Workshop building, brick structure, 12 x 6 x 4 meters, use unknown.
10. Warehouse, brick structure 35 x 10 x 5 meters. Pipe clamps, screws, pipe bends and other material were stored in this building.
11. Storage dump, in which was stored round iron, angle iron, U-iron, T-iron, rails, hoop iron in all sizes, cast iron steam heating pipes in all sizes, rough cast steel shafts, ingot steel, raw castings in all shapes, iron sheets 1 to 6 meters long, 0.8 to 2 meters wide and 2 mm to 10 mm thick, and galvanized water pipes 6 meters long and $\frac{1}{2}$ inch, $\frac{3}{4}$ inch and 3 inches in diameter.
12. Plant workshop, a brick structure 150 x 18 x 5 meters, partly reinforced by concrete pillars and iron girders. This shop worked only for plant requirements and produced such items as crankshafts, iron parts for the coke ovens, spare parts for plant locomotives and railroad cars, and parts for conveyor belts. This shop also made heating pipes and processed shafts which were up to 10 meters in length. The equipment of this shop included one 10-meter lathe, 6 other lathes, 4 milling machines, 3 drilling machines, 1 hand forge with 3 large hearths, an electric welding department with 15 electrical welding machines and an undetermined number of autogenous welding machines.

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13. Warehouse, a brick structure, 30 x 12 x 5 meters. Carbide, oil, gasoline, dyes, roofing felt, nails, screws, coal buckets, railroad lamps, pails and tinsplate, 1.5 meter long, 0.8 meter wide and 1 to 2 mm thick were stored here. There was no electrical equipment.
14. Brick structure, 6 x 4 x 3 meters. It presumably served as filling station for benzol. There was a tank 12 meters long, and 4 meters in diameter which was built underground and extended one meter above the ground. The installation was still under construction early in 1949.
15. Two tanks, 8 meters high and 6 meters in diameter, with a wall thickness of 15 mm.
16. Three settling ponds, each 50 meters long, 30 meters wide and 6 meters deep, with pumps. The side walls were of concrete. The waste water of the naphthalene installation was purified in these basins.
17. Traffic exit, with guard house.
18. Switch control station.
19. Storage shed 40 x 12 x 6 meters, steel frame structure without walls and with a wooden roof. Firebrick was stored in this shed.
20. Main entrance to the coke factory, with sentry box.
21. Storehouse and laboratory, a brick structure, 40 x 10 x 5 meters. A green, sand-like, oily mass (naphthalene sand) was stored here.
22. Cooling basin for asphalt, 20 x 6 meters, and 2 meters deep.
23. Brick smoke stack, 40 meters high with a base diameter of 3 meters.
24. An underground container for a raw material which came by rail and was called "naphthalene sand".
25. Workshop for naphthalene production, 50 x 25 x 20 meters, a two-story brick structure with concrete pillars. Circular naphthalene slabs, 50 to 60 cm in diameter and 10 to 12 cm thick, were pressed in this shop.
26. Five horizontal boilers with control gauges, 10 to 12 meters long and 3 meters in diameter. They rested on concrete supports which were 60 cm high.
27. Unidentified brick structure, 30 x 15 x 12 meters. It had concrete pillars and a steel frame.
28. Four to five horizontal boilers, 3 to 4 meters long and 1.5 meters in diameter. Steel pipes led to the boilers.

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29. A furnace capable of attaining high temperatures presumably used for asphalt production.
30. Boiler installation for liquid asphalt. A boiler, next to the asphalt furnace, was 5 meters high and 3 meters in diameter, and rested on a pillar foundation which was 3 meters high. At its base the boiler was funnel-shaped and had a discharge valve. The liquid asphalt was forced from this boiler through a giant pipe line, 25 meters long and 15 to 20 cm in diameter, into another boiler which was 15 meters high and 4 meters in diameter.
31. Collecting basin for hot asphalt. This was an open structure with concrete pillars and a wooden roof, 30 x 18 x 6 meters. After the asphalt had cooled it was crushed into small lumps with iron crowbars and moved to the asphalt mill on conveyor belts.
32. Asphalt mill. The asphalt was crushed into pieces which were of pencil thickness and were 1 to 5 cm long.
33. Loading bunker for crushed asphalt, a steel frame structure.
34. An iron tank, 15 meters long and 3 meters in diameter, supported by a steel frame which was 6 meters above ground. An oily liquid was pumped from this tank into tank cars.
35. Pumping installation for the iron tank, item 34. It was a simple brick structure, 4 x 4 x 3 meters. There were 3 horizontal piston pressure pumps which were operated by steam.
36. Six iron tanks, 5 meters high and 3 meters in diameter. The tanks were built partly into the ground. Their use was not known. They were surrounded by a brick fire wall which was 2 meters high. All the tanks were connected by pipelines.
37. Four iron tanks.
38. Unidentified brick structure, 40 x 20 x 20 meters.
39. Pumping station, a brick structure, 3.5 x 2.5 x 3 meters, equipped with 2 horizontal piston pumps operated by steam.
40. Test station equipped with measuring instruments, 5 x 3 x 4 meters, made of fire brick.
41. Fitting shop (Schlosserwerkstatt) for the repair of boilers and pipe lines, a brick structure, 12 x 10 x 6 meters, equipped with 1 lathe, 1 drilling machine, 1 milling machine and several workbenches with vises.
42. Unidentified brick structure, 35 x 10 x 8 meters.
43. Unidentified brick structure, 15 x 5 x 4 meters. It had a flag stone floor and was allegedly equipped with special pumps.

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44. Brick structure, 45 x 25 x 35 meters, called the benzol shop. Early in 1949 the workshop was still under construction and pipe lines with a diameter of 1.2 meters (sic) were observed.
45. Two horizontal iron tanks, 18 meters long and 4 meters in diameter. The tanks were sunk into the ground and the top was flush with the ground. The tanks were roofed. The use of the tanks was not known.
46. Round iron tank, 35 meters high and 4 meters in diameter, mounted on a concrete base. An outside spiral staircase led to its top. Its use was not known.
47. Two iron boilers, 8 meters high and 6 meters in diameter, mounted on an iron base which was 1 meter high. The boilers were connected by pipe lines. They were also connected with the adjacent distillation columns and filter boilers.
48. Two wooden cooling towers, 25 meters long, 30 meters high and 12 meters in diameter.
49. One-story brick structure, 15 x 15 x 10 meters. First aid station, laboratory and office rooms.
50. Boiler house, a brick structure 75 x 30 x 40 meters. There were 4 boilers which were 12 meters long, 5 meters wide and 25 meters high. The reconstruction of 3 destroyed boilers was planned. The incoming shipments included about 120 tons of coal per day. The coal for firing the furnaces came through seven funnels on the roof.
51. Coal bunker of the boiler house. It was connected with the funnels of the boiler house by an elevator.
52. Loading device for slag material from the boiler house which was to be moved to the slag pile.
53. Unidentified brick structure, 30 x 8 x 12 meters.
54. Solidly built brick structure, 120 x 50 x 20 meters. It served as a temporary workshop early in 1949.
55. Brick building under construction, 40 x 15 x 25 meters. Construction started in May 1948.
56. Power cable distribution point, a brick structure, 15 x 6 x 20 meters.
57. Steam pipe line, about 30 cm in diameter. The pipe line was rather heavily insulated.
58. A brick structure with a flat roof, 15 x 8 x 4 meters, housing the plant telephone switchboard and also used as quarters for the plant guard unit.
59. Office building, a three-story brick structure, 25 x 20 x 15 meters.

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60. Hexagonal cooling tower, about 30 meters high with a base diameter of 25 meters. It was a steel frame with wooden planking and presumably was used in the production of ammonia. Pipe lines led in the direction of the two iron boilers, item 47.
61. Two small wooden houses, probably residential buildings.
62. Main entrance and guard house.
- 62a. Overpass crossing the tracks, 25 meters long and 6 meters high, a steel frame structure, to be used only by pedestrians.
63. Storage shed, a brick structure with wooden roof, 120 x 8 x 4 meters. Rail spikes and base plates for rails were stored in this building. There was also a small fitting shop (Schlosserei) and a carpentry shop.
64. Distillation columns and filter boilers.
65. Pumping station.
66. Smoke stack.
67. Unidentified structure.
68. Storage shed.
69. Storage shed.
70. Smoke stack.
71. Sales stand.
72. Smoke stack.
73. Storage shed.
74. Coke pushing ram.
75. Coke pushing ram.
76. Unidentified brick structure.
77. Battery No 1 of coke ovens.
78. Battery No 2 of coke ovens.
79. Coal storage bin.
80. Blast chamber for flue gases.
81. Coal storage bin.
82. Battery No 3 of coke ovens.
83. Battery No 4 of coke ovens.

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84. Unidentified brick structure.
85. Sulphuric acid tanks.
86. Power plant.
87. Vibrating chute used to convey coke.
88. Platform where coke is discharged to a conveyor belt.
89. Rubber conveyor belt.
90. Coke sorting installation with storage bin.
91. Destroyed coke quenching tower.
92. Coke sorting installation with storage bin.
93. Rubber conveyor belt.
94. Platform where coke is discharged to a conveyor belt.
95. Vibrating chute used to convey coke.
96. Coke sorting shop.
97. Coke quenching tower.
98. Container for fine coke.
99. Rubber conveyor belt.
100. Coal sorting station equipped with three elevators and conveyor belts.
101. Coal crushing and coal washing installation.
102. Pumping station for the coal washing installation.
103. Pumping station for the centrifugal filter.
104. Pipe line, centrifugal filter and coal slime collector.
105. Settling basin with bridge crane for coal slime.
106. Office building with tool shed.
107. Weighing machine for coal and coke shipments.
108. Construction office.
109. Tool shed.
110. Shed for shunting engines.
111. Cable ditch.

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- 112. Guard house.
- 113. Crane installation.
- 114. Low wooden building.
- 115. Tool shed.
- 116. Low wooden buildings.
- 117. Warehouse.
- 118. Locomotive repair shop.
- 119. Holding shop.
- 120. Cooling tower, about 30 meters high and 15 meters in diameter.
- 121. Warehouse brick structure, 100 x 20 x 8 meters.
- 122. Warehouse.
- 123. Barracks for fire brigade.
- 124. Warehouse for machine oil.
- 125. Low wooden building.
- 126. Locomotive sheds.
- 127. Shelters.
- 128. Storage bin and inclined hoist.
- 129. Blast furnace No 5.
- 130. Three hot blast stoves.
- 131. Warehouse for spare parts for the blast furnace installation.
- 132. Collecting trough for liquid metal with tapping chute and crane installation.
- 133. Open structure, storage dump for foundry sand.
- 134. Unidentified workshop building.
- 135. Cable hoist used in charging the blast furnace.
- 136. Blast furnace No 4.
- 137. Storage dump and small repair shops.
- 138. Three hot-blast stoves.
- 139. Destroyed workshop building.
- 140. Degassing installation, allegedly in operation since

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November 1947 on a limited scale and since March 1949 at full capacity.

141. Old machine house.
142. Repair shop.
143. Storage shed.
144. Warehouse for spare parts for the blast furnace installation.
145. Storage and fitting shop.
146. Office building for the blast furnace department.
147. Blast furnace No 3, destroyed.
148. Blast furnace No 2 with three hot-blast stoves.
149. Inclined hoist used for charging the blast furnace.
150. Casting shop with casting trough and crane installation.
151. Three filter boilers.
152. Unidentified workshop building.
153. Low wooden building.
154. Tool shed.
155. Coal dump.
156. Repair shop.
157. Unidentified workshop building, allegedly a forge.
158. Three filter boilers.
159. Blast furnace No 1 with three hot-blast stoves.
160. Inclined hoist used for charging the blast furnace.
161. Railroad underpass.
162. Movable platform crane (Buehnankran).
163. Dumping pit for red iron ore.
164. Low wooden building.
165. Slag quenching basin.
166. Crane installation.
167. Pig iron foundry with casting pits and two crane installations.

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168. Forge.
169. Low wooden building.
170. Storage shed.
171. Low wooden building.
172. New boilerhouse.
173. Shed.
174. Guardhouse.
175. Unidentified brick structure, 50 x 15 x 20 meters.
176. Warehouse, a wooden frame and brick structure, in which salt and chemicals were stored.
177. Concrete and brick structure, 150 x 25 x 25 meters. It was allegedly a boilerhouse with four small boilers in operation and two boilers under construction late in 1948. It was part of the transformer station and emergency power plant, item 178.
178. Transformer station and TETs emergency power plant. A concrete and brick structure, 130 x 40 x 35 meters. Power was supplied from the Dnepr Power Plant near Zaporozhe. There was also a blast furnace gas and coal dust fired power plant. It allegedly supplied current for illumination of the Combine and of the town of Voroshilovsk and served also as emergency power unit.
179. Two cooling towers, each 40 meters high and 25 meters in diameter. Steel structure with wooden planking. A pipe line led to the blast furnace installation.
180. Traveling crane. Its carrying capacity was estimated at 20 tons. It was used for loading pig iron from the foundry, item 167.
181. Former rolling mill, 300 meters long and 200 meters wide. It was completely destroyed. No preparations for its restoration were observed until early in 1949.
182. Open structure, 80 x 50 x 30 meters with steel bracings on the sides and a corrugated sheet metal roof. It was equipped with one small traveling crane.
183. Warehouse, a steel structure with wooden planking, 250 x 200 x 25 meters. Materials stored here included electric motors, sliding valves, steel and iron plates for blast furnace repairs, dismantled German machine tools, girders and rails, copper and iron wire, insulators and other material required in the plant.

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184. Catwalk, 700 meters long, 2 meters wide and 20 meters high. It was a steel structure with wooden planks and served only for passenger traffic. It connected the highway in front of the plant with the Voroshilovsk railroad station.
185. Voroshilovsk, formerly Alchevsk, railroad station
186. PW Camp No 7144/9 with sawmill. The sawmill operated for the entire Combine.
187. Plant kitchen for the leading personnel.
188. Unidentified building.
189. A two-story structure. The plant kitchen for workers was on the ground floor and the technical designing offices were on the second floor of this building.
190. Technical designing building, brick structures about 900 meters long and 10 meters wide.
191. First aid station.
192. Guardhouse and main entrance of the plant, including an entrance for vehicles.
193. Workshop buildings, brick structures with wooden roof, 35 x 20 x 3 meters.
194. Toilet.
195. Boilerhouse, a concrete and brick structure, 60 x 18 x 10 meters. It supplied the entire plant with steam and hot water.
196. Brick smoke stack for the boilerhouse, 50 meters high with a base diameter of 4 meters.
197. A brick structure, 30 x 15 x 25 meters, probably a residential building..
198. Small wooden shed with an entrance for trucks. This shed was used by a janitor.
199. Partly destroyed pumping station, concrete and brick structure, 120 x 40 x 10 meters.
200. Pond, 250 meters long and 80 meters wide. It was a draining pond for the cooling water of the blast furnace installation. The pumping station, item 199, pumped the cold water back to the blast furnace installation.
201. Plant fire brigade.
202. Technical management, a three-story brick structure, 60 x 15 x 15 meters. German PW engineers were employed here.

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- 203. Residential buildings for plant employees.
- 204. Pond used to collect waste water.
- 205. Pond used to collect and clarify muddy water and to supply water to the plant.
- 206. Three concrete mud basins, each 20 x 15 meters and 4 meters deep.
- 207. Workshop buildings and small office building.
- 208. Workshop buildings, use unknown.
- 209. Workshop building, use unknown.
- 210. Workshop building, use unknown.
- 211. Workshop building, equipped with special lathes, the type and number of which were not known.
- 212. Machine shop equipped with machine tools.
- 213. Plant kitchen.
- 214. Steam forge, (Dampfschmiede), new concrete structure, 120 x 30 x 50 meters. Construction of this forge started in 1948 and was not yet completed as of the beginning of 1949.
- 215. Soviet convict camp with 250 to 300 inmates.
- 216. Two blockhouses.
- 217. Bathing establishment.
- 218. First aid station and offices.
- 219. Plant kitchen.
- 220. Automobile garage with facilities for parking 30 trucks and with workshops.
- 221. Two blockhouses.
- 222. Plant kitchen.
- 223. Plant kitchen.
- 224. Warehouse for plant kitchen.
- 225. Warehouse for plant kitchen.
- 226. Warehouse for plant kitchen.

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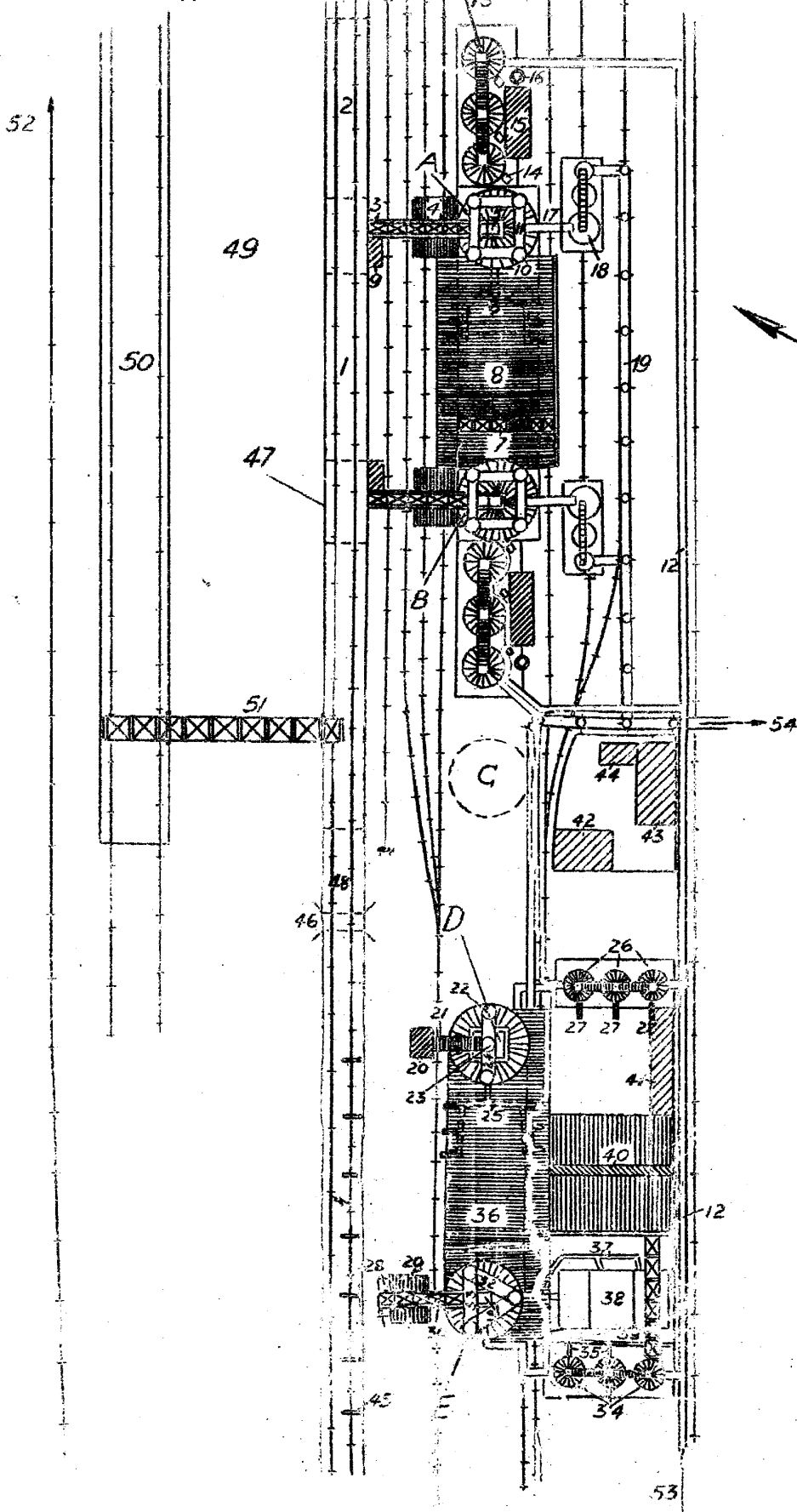
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- 227. Warehouse for plant kitchen.
- 228. Automobile engine repair shop for plant-owned trucks.
- 229. Automobile engine repair shop for plant-owned trucks.
- 230. Sawmill equipped with two saw frames with a distance of 1 meter between the two saws. A wooden structure, 50 x 30 x 6 meters.
- 231. Two drying installations for cut lumber.
- 232. Carpentry shop, no details were known.
- 233. Workshop in which machines of the sawmill, item 230, were repaired.
- 234. Boilerhouse under construction. Construction started in June 1947. Three boilers were scheduled. One boiler, about 10 meters long and 3 meters in diameter was set up early in 1949.
- 235. Furnace installation for carbide production.
- 236. Lime kiln.
- 237. Slag block factory, a brick structure, which produced slag blocks for plant requirements and housing construction.
- 238. Cement factory.
- 239. Cement dump.
- 240. Unidentified building.
- 241. Small storage shed.
- 242. Gatekeeper's house and entrance to the sawmill.
- 243. Carpentry shop, under construction.
- 244. Slag crusher.
- 245. Billets for workers.
- 246. Slag dump, about 1,000 meters long and 1,000 meters wide.

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SCALE: about 1:2000

Blast Furnace Plant of the Voroshilovsk Ironworks Combine

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Legend:

- A. Blast furnace No 1, which was destroyed by the Soviets during the war. Reconstruction of this furnace started in 1944 and it has been in operation since October or November 1947. The furnace was of American design. The height, up to the hopper, was about 50 meters and it was 20 meters in diameter. Its daily capacity was about 1,200 tons of pig iron.
 - B. Blast furnace No 2, mainly of American design. It has been in operation since December 1948. The dimensions of this furnace were the same as blast furnace No 1.
 - C. Blast furnace No 3, which had been demolished. No preparations for its reconstruction had been observed as of the beginning of 1949. This furnace was of an old French design.
 - D. Blast furnace No 4, of French design. Its height up to the hopper was about 35 meters and its diameter about 15 meters. The daily capacity was 500 to 600 tons of pig iron. The furnace remained intact during the war.
 - E. Blast furnace No 5, of Russian design. Its height, up to the hopper, was about 30 meters and its diameter about 12 meters. The daily capacity was allegedly 400 to 500 tons of pig iron.
1. Below each track were about 25 reinforced concrete hoppers into which incoming raw materials were discharged to be mixed and conveyed to the inclined hoist.
 2. About 20 more reinforced concrete hoppers.
 3. Double track inclined hoist with two cages, used for charging the blast furnace No 1. It was about 80 meters long.
 4. Housing for the mechanism of the inclined hoist. This was a steel and brick structure, 15x15x10 meters, resting on a steel frame which had an underpass 5 meters wide for railroad traffic. There was a special winch and switch gear and safety fuses for the electrical equipment of the blast furnace.
 5. Hopper, 4 meters long and 4 meters wide.
 6. Casting trough with 3 grooves on each side. The trough was 60 cm high, 80 cm wide at the top and 20 cm wide at the base.
 7. Suspension crane (Schwebekran), with a carrying capacity of about 20 tons.
 8. Casting shop, an open structure buttressed by steel posts with a corrugated sheet metal roof, 80x35x30 meters. The upper platform was 8 meters above the ground. Sand for the casting pits and vats used as receptacles for slag were in the center of the shop.
 9. Cleaning device for the inclined hoists.
 10. Four metal smoke stacks, each 30 meters high. On each smoke stack was a flap for the escape of excess gases. The escape gas came out in a darting flame.
 11. Four connecting catwalks, 2 meters below the top of the metal smokestacks.
 12. Gas pipeline, 50 cm in diameter, which conveyed the purified gases from the coke factory.
 13. Three round hot-blast stoves, 25 meters high and 5 meters in diameter. They were made of steel plate and firebrick. The stoves were mounted on a reinforced concrete base which was 5 meters high, 30 meters long and 15 meters wide.
 14. Three highspeed electric motors.
 15. Switchboard, safety and test station for pressures and temperatures of the hot blast stoves and electric motors. The switchboard was housed in a brick structure 12x6x12 meters.

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16. Brick smokestack, 60 meters high.
17. Escape pipe for the waste gases of blast furnace No 1. The pipe diameter was 2 meters. The pipe was connected to the blast furnace at a height of 18 meters and the other end was connected to one of the filter boilers at a height of 10 meters.
18. Three filter boilers. The largest one was 8 meters high and 4 meters in diameter. Each of the two remaining boilers was 6 meters high and 3 meters in diameter. They were placed in a steel frame 20 meters long, about 8 meters wide and 5 meters high. The largest boiler collected the flue dust and the waste gases and conveyed them through the two smaller boilers to the degassing department.
19. Pipeline to the degassing department, a zigzag design. The pipe diameter was 2 meters. At each lower end was a device for cleaning the pipe line.
20. Vertical hoist with cage-like containers for charging the blast furnace. It was similar to a paternoster lift.
21. High bridge, 15 meters long and 55 meters above the ground, with one narrow gauge railroad track.
22. Platform with hopper.
23. Three metal smokestacks, each 25 meters high. On each smokestack was a flap for the escape of excess gases. The gases of blast furnaces No 1 and 2 were collected and utilized while the gases of blast furnace No 4 escaped entirely.
24. Catwalk between the metal smokestacks, 2 meters below the top of the smokestacks.
25. Casting troughs.
26. Three round hot-blast stoves, 25 meters high and 5 meters in diameter. They were made of steel plate and firebrick, and rested on a reinforced concrete base which was flush with the ground.
27. Pipelines, 50 cm in diameter, leading to the hot-blast stoves.
28. Stock bin.
29. Housing for the mechanism of the inclined hoist. This was a steel and brick structure, 10x10x8 meters. It was built on the ground and was equipped with one special winch as well as a switch gear and safety fuses for the electrical equipment of blast furnace No 5.
30. Double track inclined hoist with two cages for charging blast furnace No 5. It was 60 meters long.
31. Hopper, 4 meters square.
32. Three metal smokestacks, each 30 meters high with the same mechanism for escape gases as the other smokestacks.
33. Catwalk between the smokestacks. They were 2 meters below the top of the smokestacks.
34. Three round hot-blast stoves, 25 meters high and 5 meters in diameter. They were made of steel plate and firebrick. The stoves rested on concrete bases flush with the ground.

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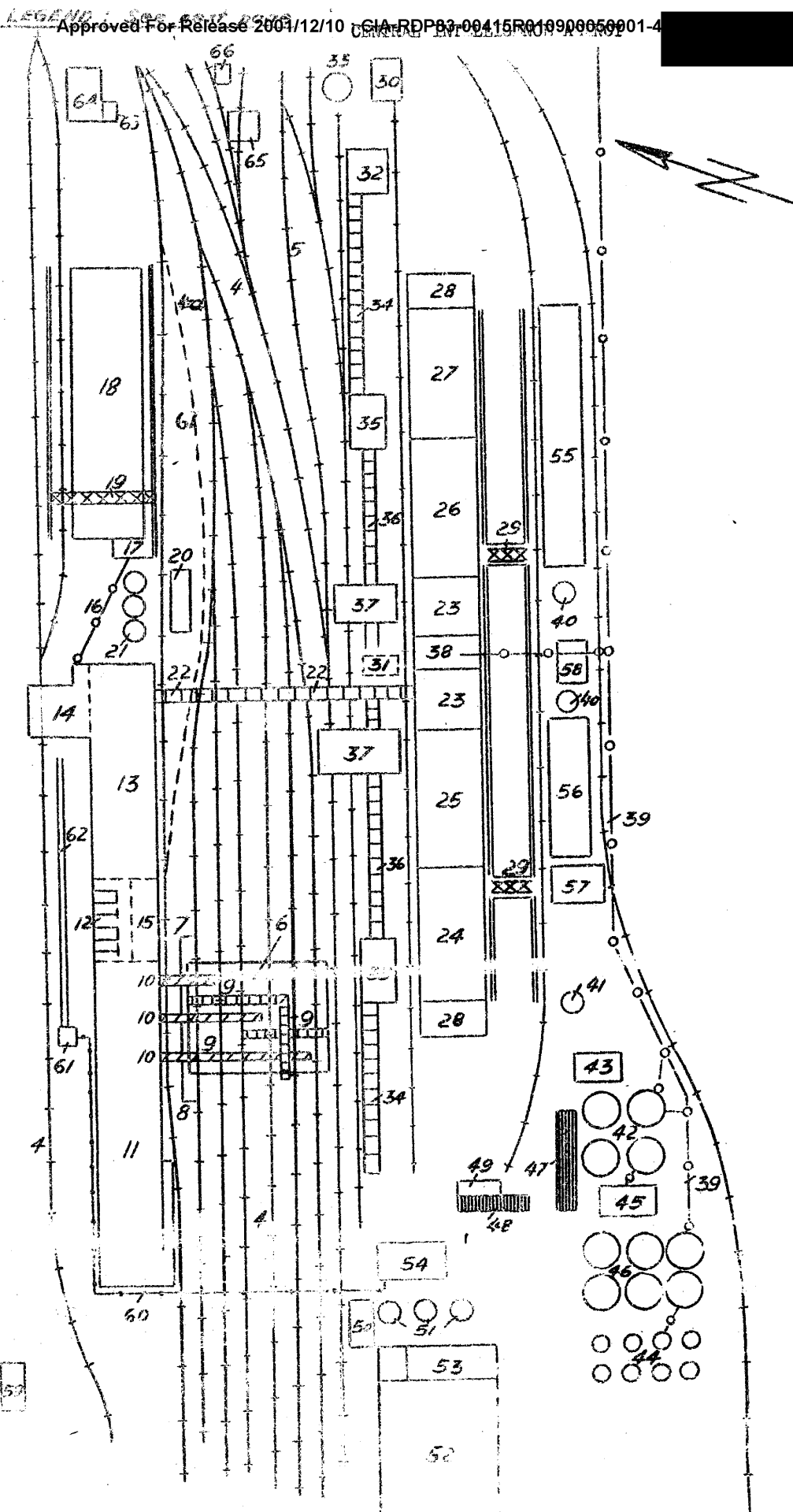
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35. Pipelines, 50 cm in diameter, leading to the hot-blast stoves.
36. Unidentified workshop, 50x30x10 meters, a corrugated sheet metal structure with a steel frame.
37. Casting troughs, 40 cm deep, top width 60 cm, base width 20 cm. The wall thickness was 10 cm. The distance from the tapping hole to the casting pit was 8 meters.
38. Casting pit. It was partitioned into three equal sections and was terraced. The total length was 30 meters, the total width 15 meters and the total depth 0.5 meters. The wall thickness was 20 cm. The pit was lined with firebrick. The cooled iron was broken by workers with heavy iron hammers into small lumps. The lumps, each of which weighed about 10 kgs, were loaded on railroad cars.
39. Ten-ton traveling crane.
40. Open structure with corrugated sheet metal roof. It was a dump for sand.
41. Small repair shop and material depot, a brick structure, 35x8x4 meters.
42. Office building of the blast furnace department, a brick structure, 15x8x5 meters.
43. Forge and fitting shop, a steel and brick structure, 22x10x6 meters, equipped with 2 lathes, 1 drilling machine, 1 milling machine, several autogenous welding instruments. Small parts of the hoppers, Item 1 and 2, were repaired in this shop.
44. Material warehouse for the forge and fitting shop, a brick structure, 8x1x4 meters.
45. Single-track wide-gauge railroad line. Early in 1949 it was completed as far as the hoist of blast furnace No 4. Transmission towers for electrical operation were installed.
46. Railroad underpass, used in conveying red iron ore by grab buckets from the storage dump to the blast furnaces.
47. Double-track, wide-gauge tracks, eight meters above the ground. They ran from blast furnace No 1 to blast furnace No 5. The length was estimated at 400 meters. The width of the embankment was 12 meters and the distance between the two tracks was 6 meters.
48. Repair shop, 2 meters underground, and between the tracks. Repairs were made on the special railroad cars which were used to fill the hoppers items 1 and 2.
49. Storage dump for red iron ore, 200 meters long and 80 meters wide.
50. Dumping pit for red iron ore, 250 meters long, 12 meters wide and about 10 meters deep, with reinforced concrete foundations for two wide-gauge tracks.
51. Movable bridge crane, carrying capacity about 20 tons.
52. Spur track to the Voroshilovsk, the former Alchevsk, railroad station.
53. Gas pipeline from the coke factory.
54. Direction to the degassing plant.

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SCALE: about 1:2000

Coke and Chemical Plant of the Voroshilovsk Iron Works Combine

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Legend:

1. Wall, 2 meters high, made of slag-concrete, reinforced with barbed-wire.
2. Hard surfaced road.
3. Debaltsevo (48°21'N/38°26'E)-Voroshilovgrad (48°34'N/39°20'E), double-track main railroad line.
4. Spur tracks and plant track.
5. Electrified railroad track, completed in October 1948, but not in operation as of January 1949 because the towers were still missing.
6. Three reinforced concrete coal bunkers, each 10x10 meters and 8 meters deep, built in a funnel shape with roofs. The base opening was 50x50 cm. On the bunkers were iron grates with openings of 25x15 cm, on which the loaded coal was poured. Coarse coal lumps were broken by hand.
7. Rest room for personnel supervising the unloading of coal.
8. Rest room for workers who unload the coal.
9. Rubber belt conveyors used to move the coal from the bunkers to the hoists.
10. Three inclined hoists used to convey the coal to the coal crushing installation at a height of about 40 meters.
11. Coal crushing installation, a brick structure, 150x40x50 meters. There were 20 mills, each having a capacity of 3 to 4 tons, in this installation.
12. Hoist used to move the crushed coal to the coal washing installation.
13. Coal washing installation, a concrete and brick building, 100x40x65 meters. There were 4 to 5 rubber conveyor belts and several funnel shaped storage bunkers. The fine coal slime was washed off the coal by spraying with water.
14. Annex building, 30x30x30 meters, which housed the pump of the coal washing installation.
15. Repair shop, a concrete and brick structure, about 60x40x10 meters.
16. Cast iron pipeline, 50 cm in diameter and about 70 meters long, inclined 2 meters downward. It conveyed the fine coal slime to the settling basin.
17. Installation for the collection of coal slime, a brick structure, 10x5x3 meters. The slime was moved from this installation to the settling basin.
18. Concrete settling basin for coal slime, 120 meters long, 60 meters wide and 1.5 meters deep.
19. Bridge crane used to load the coal slime on railroad cars. The crane buckets had a capacity of 1.5 tons.
20. Pumping station for the centrifugal filters, a three-story brick structure, 40x10x35 meters. There was a workshop as well as a switchboard and safety fuses in the basement.
21. Three centrifugal filters which operated like stirrers. They removed the last traces of mud from water which came from the settling basin. They were round containers each about 10 meters deep and 10 meters in diameter.

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22. Rubber conveyor belt, 150 meters long, 1 meter wide and 2cm thick. It started at the coal washing and crushing installation at a height of about 5 meters and ended at the coal storage bin at a height of about 85 meters. It was used to convey the washed and crushed coal to the coke ovens.
23. A funnel-shaped coal storage bin, 40x30x90 meters, made of reinforced concrete, and used as a collecting and distributing point for coal used in the coke ovens.
24. Battery No 1 of coke ovens. It was destroyed by the Soviets during the war and reconstruction was started in May 1948. It was built of special clinkers. Around the building was an insulating structure made of steel with wooden partitions lined with glass wool.
25. Battery No 2. It was not destroyed and has been constantly in operation. It was about 60 meters long and the existing 80 chambers were 10 meters deep and about 6 meters wide.
26. Battery No 3. It was destroyed during the war but was reconstructed and has been in operation since October 1947. Its dimensions are the same as Battery No 2. On the flat roofs of the three reconstructed batteries there were several openings with lids which were lifted by a crane-like device when coal was being loaded. On both sides at the base of the batteries were locking plates reinforced by firebrick. These plates were removed when the batteries were to be emptied.
27. Battery No 4, which was destroyed. In January 1949, it was razed in preparation for its reconstruction.
28. Unidentified concrete and brick structures, 40x12x28 meters.
29. Coke pushing rams which were constructed of steel. There was one for the Batteries 1 and 2 and another one for the Batteries No 3 and 4.
30. Coke quenching towers made of concrete, 10x6x35 meters. Railroad cars loaded with glowing coke by the coke pushing rams came to this tower where they were quenched by being sprayed with water.
31. Destroyed coke quenching tower. No preparations for its reconstruction were observed as of January 1949.
32. Unidentified new brick structure, 20x8x4 meters, probably a coke sorting installation.
33. Collecting basin for fine-grained coke, a round, concrete structure.
34. Vibrating chute used to convey coke.
35. Platform where coke is discharged to a conveyor belt.
36. Rubber conveyor belt, 80 cm wide. The coke was conveyed to the sorting installation at a height of 40 meters.
37. Coke sorting installation with 2 storage bins which were 40x25x25 meters and 30x20x20 meters.
38. Concrete structure, 25x12x25 meters, connecting the coal storage bins. It was presumably a collecting tank and blower installation for coke oven waste gases.

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39. Gas pipeline, 70 cm in diameter, leading to the gas condensing installation.
40. Brick smokestack of Battery No 2, 96 meters high and brick smokestack of Battery No 3, 92 meters high.
41. Reinforced concrete smokestack of Battery No 1, 106 meters high.
42. Gas condensing installation, comprising 4 tanks each 5 to 6 meters high and 10 meters in diameter, placed on concrete bases, 2x10x4 meters. Various pipelines ranging from 20 to 50 cm in diameter led to the distillation columns and filters. It has been in operation since June 1948. Tar was separated in this installation and there was a gas pipeline to the blast furnace department.
43. Pumping station, a brick structure, 8x5x4 meters. Three pumps were installed. The station presumably was used in the production of distilled products.
44. Distillation columns, comprising 8 tanks each 55 meters high and 4 to 5 meters in diameter. Benzol was produced here.
45. Naphthalene production and part of the distillation installation housed in a 2-story building, 40x20 meters. The naphthalene separated from a liquid was ground in special mills and the fine powder was pressed into circular slabs, 20 cm thick and 50 cm in diameter, each weighing 10 kg.
46. Six tanks each 40 meters high and 6 meters in diameter. Round wooden lath grids were placed into these tanks and were replaced every 6 months when they appeared to have been burned. According to Soviets, these tanks served as filters.
47. Ramp which was very steep, as the terrain south of this area was about 5 meters lower than the rest of the plant area.
48. Stairway.
49. Office building.
50. New ammonium sulphate installation.
51. Three to four sulphuric acid tanks resting on reinforced concrete pillars. Each of the tanks was 6 meters high, 4 meters in diameter and the walls were made of sheet steel which was 1.5 cm thick. On the inside they were lined with a strong lead coating. Several pipelines ranging from 20 to 60 cm in diameter led to these tanks.
52. Brick building on concrete pillars, 120x50x20 meters. It was still used as temporary workshop as of early 1949. It was allegedly scheduled to be used by the ammonium sulphate department.
53. Brick structure, 40x15x25 meters, still under construction.
54. Power plant, reinforced concrete and brick structure, 60x40x25 meters. There were several generators in the basement. On the ground-floor were 2 very large turbines and a switchboard room separated by a glass partition.
55. Storage shed, a brick structure, 100x20x4 meters. Fireproof material for the coke oven batteries were probably stored in this shed.

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56. Storage shed, a brick structure, 60x40x20 meters in which building materials were stored.
57. Storage shed, a wooden structure, 25x15x3 meters in which building materials were stored.
58. Sales stand.
59. Repair shop.
60. A suspension bridge for pedestrians, 5 meters above the ground, leading from the power plant to the distributor tower. The cables were suspended at the sides.
61. Distributor tower for cable lines, a brick structure, 4x4x10 meters.
62. Concrete cable ditch, 150x3 meters, 1.8 meters deep. Between the tracks and the cable ditch were 6 shelves, each supporting 2 to 3 cables. The cables were about 5 cm in diameter.
63. Tool shed.
64. A brick structure, 20x15x4 meters, housing the administrative office for rail construction and transportation.
65. Weighing machine for coal and coke shipments.
66. Office of the manager of building operations in the combine.
67. New track installation, scheduled to be completed by the end of 1949.

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